

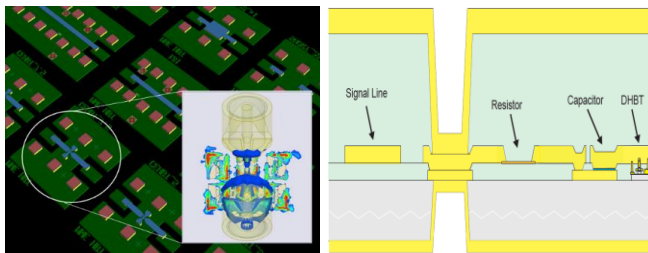
Master / Semester Project

Millimeter Wave Electronics Laboratory, D-ITET
 Prof. Bolognesi

Full-Wave Electromagnetic (EM) Simulations for Passive Elements in InP/GaAsSb-based DHBT Technology

Vision and Future Application

The explosive growth in millimeter- and sub-millimeter-wave systems has provided a significant challenge to conventional microwave circuit design methodologies. Due to high operating frequencies, circuit dimensions are of the same order of magnitude as the operating wavelength, therefore requiring distributed parameter approach. Furthermore, because of the large number of mutual couplings on a chip, influence of the substrate, other adjacent components, etc, full-wave **electromagnetic (EM) analysis and simulations** need to be performed for accurate modelling of passive elements in a technology.



(a) Layout of the passive and active elements with one EM simulation example, (b) Cross section of the technology substrate

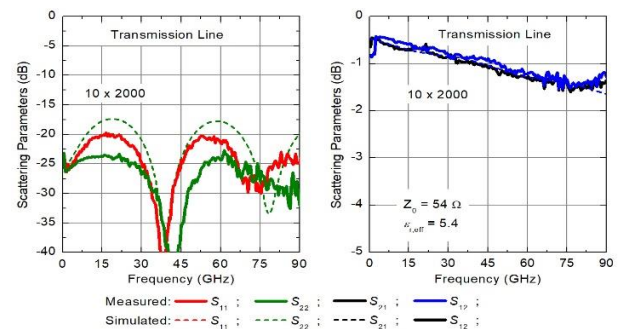
Thesis Description

Before fabrication of a monolithic microwave integrated circuit (MMIC) precise simulations in high frequencies are needed. For this purpose, an error-free model of each of the passive and active elements should be available to ensure that the measurements meet the simulation results. Your task is to provide an EM model for each of the passive elements being used in our InP double heterojunction bipolar transistor

(DHBT) technology with the provided technology substrate and compare the results with measurements and already existing models.

You will

- Gain insight into the passive elements structures and their fabrication process flow.
- Gain insight into electromagnetic wave flow in passive elements.
- Practice simulation in computer-aided design software (CAD) i.e. ADS and ADS-EM Pro.



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